

Basic Economic Concepts

OBJECTIVE: The student will become familiar with the following items:

- Economic Fundamentals
 - Scarcity
 - Choices
 - Basis of Benefits Estimates
- Types of Costs
- Equivalence of Money Values
- Evaluation Tools

SCARCITY:

Limited Resources

+

Unlimited Wants and Needs

=

The Fundamental Economic Problem

SCARCITY:

- Virtually no resource is available in limitless supply
- Tendency to view everything as an “indispensable necessity”
- We can’t do everything

Choices:

- Limited resources with unlimited wants and needs forces decisions
- Choosing one thing means giving up another (opportunity cost)
- Economics examines the logic of choices among available possibilities

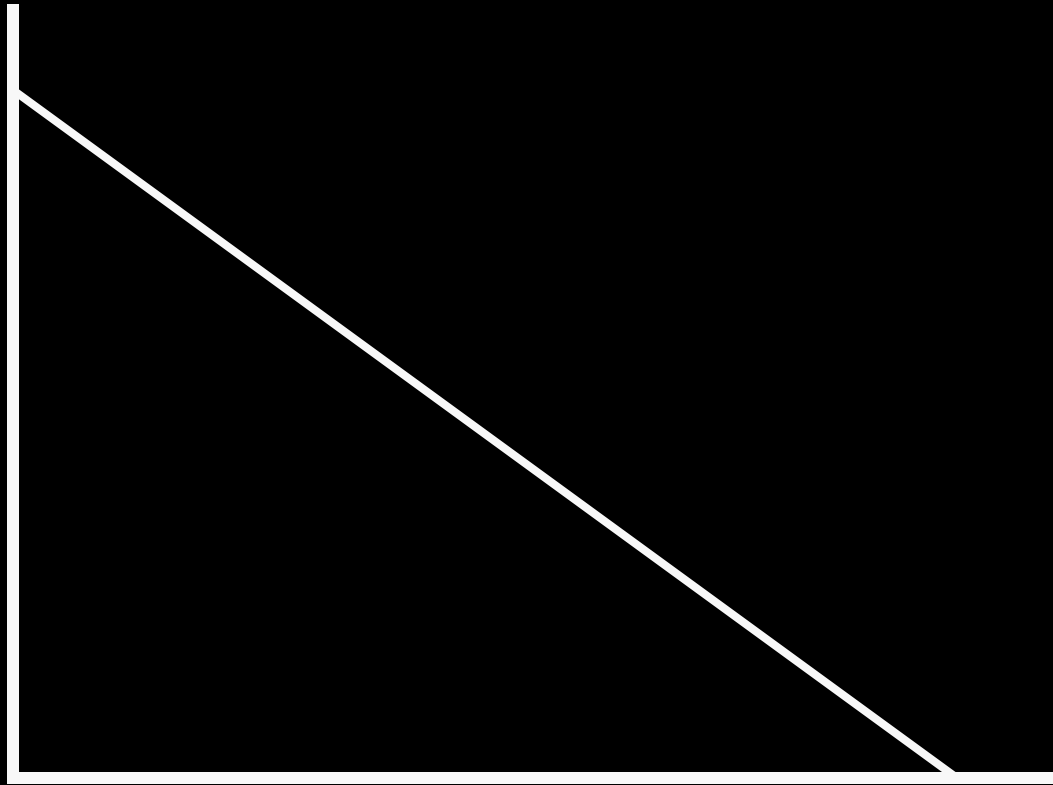
Choices:

- Optimal decisions select the most desirable option among the possibilities that the resources permit
- Choices have costs
- They cost us the opportunity to do something else.

Basis of Benefits:

Demand

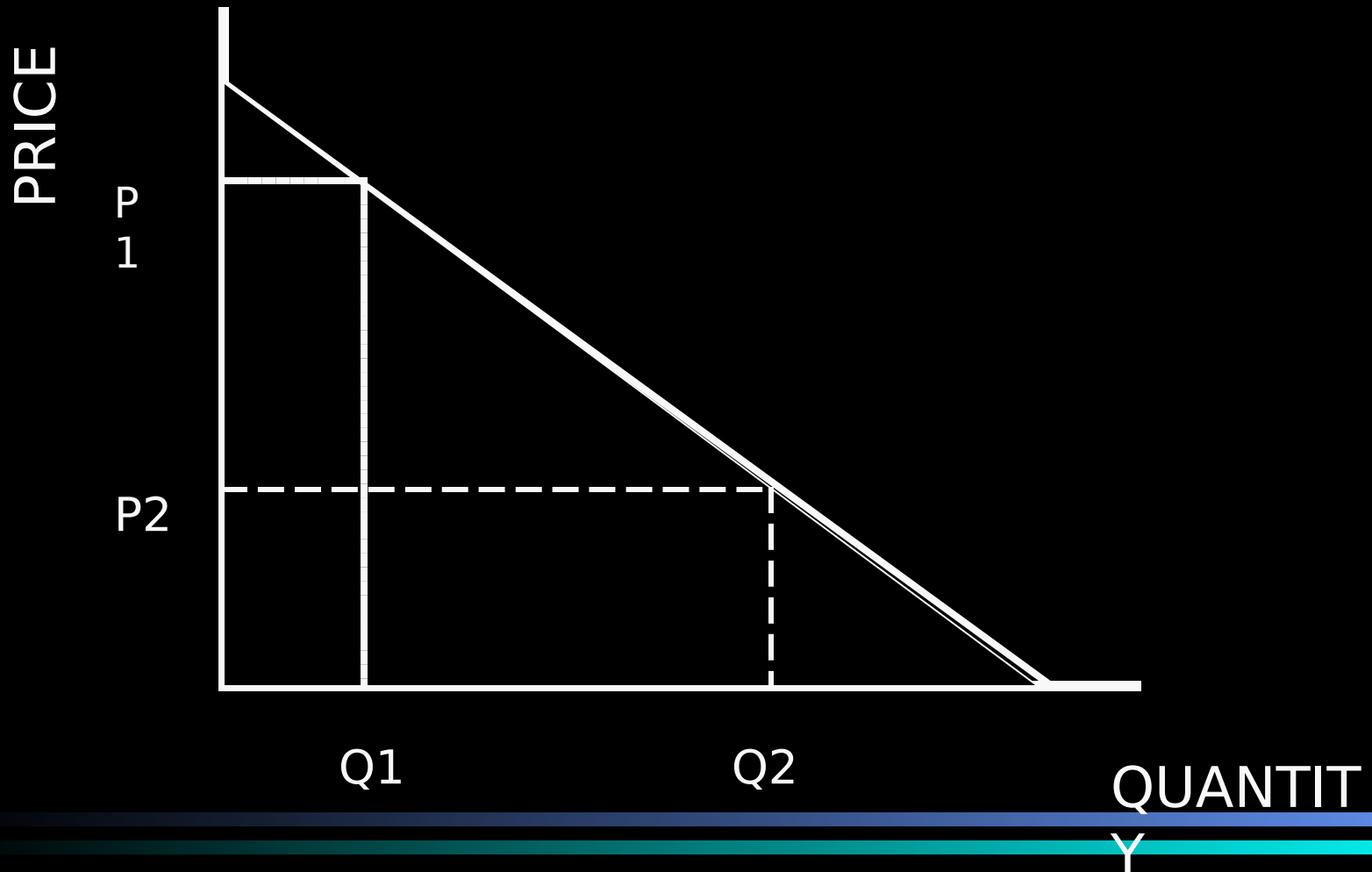
PRICE



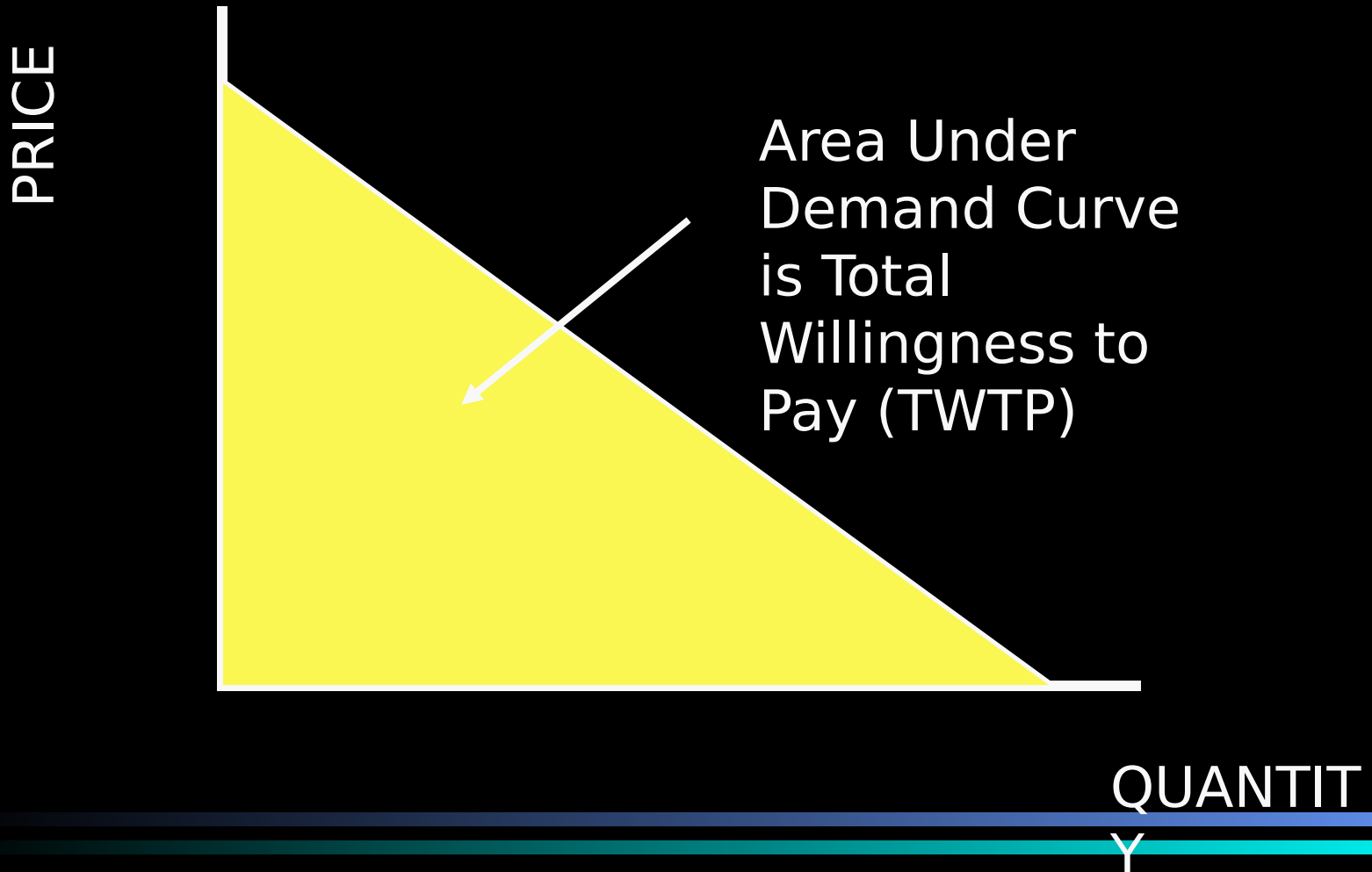
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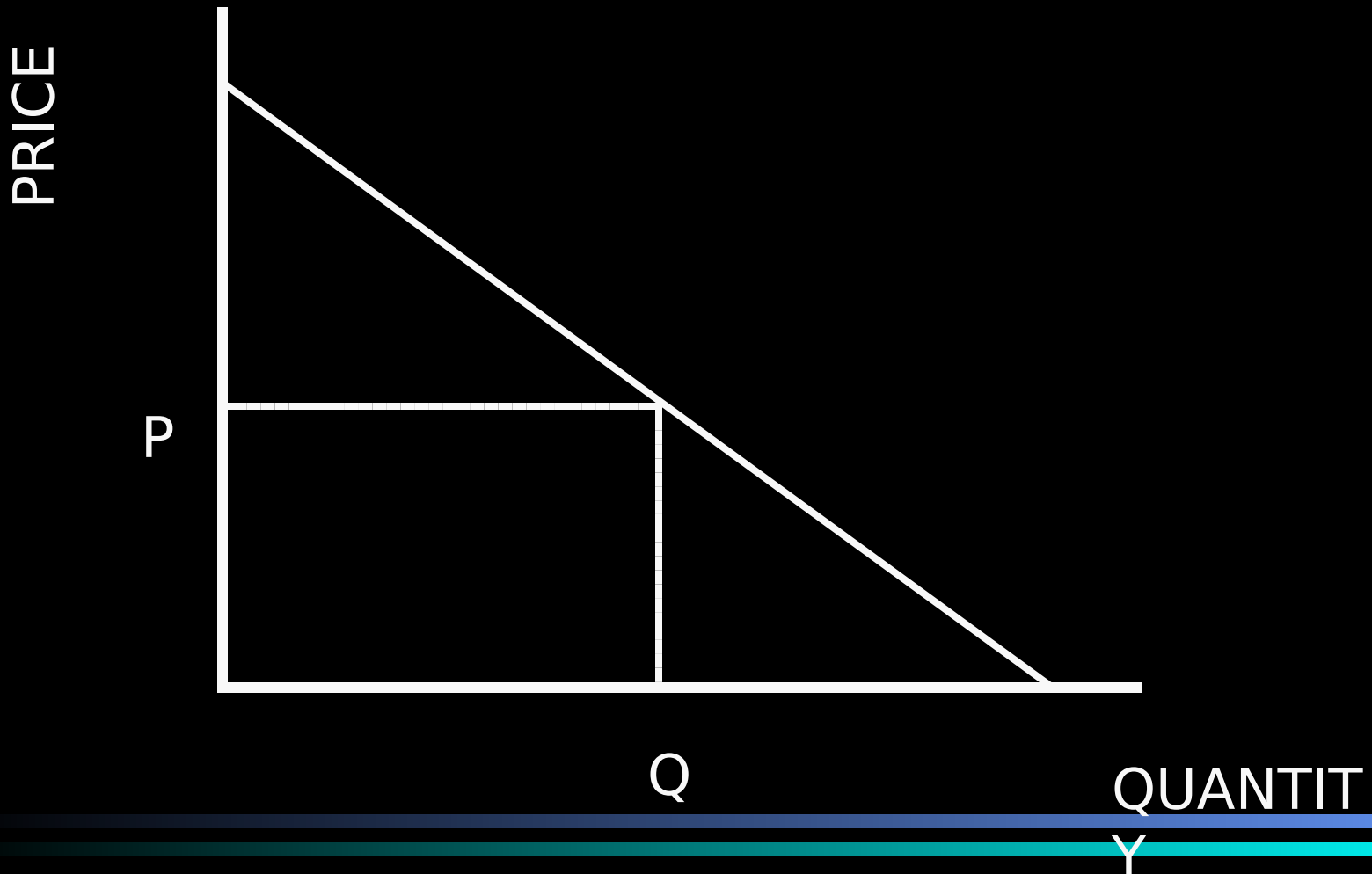
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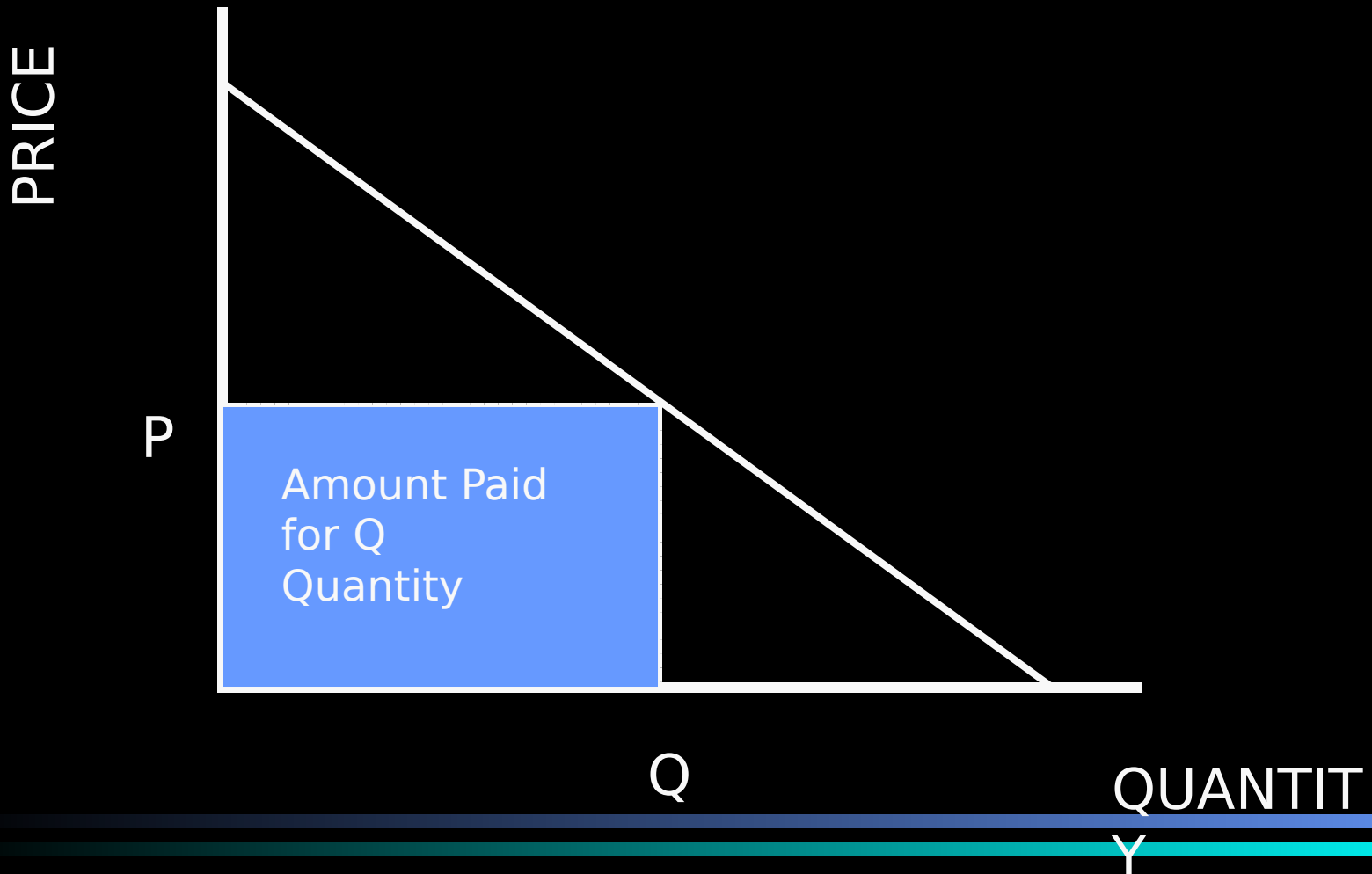
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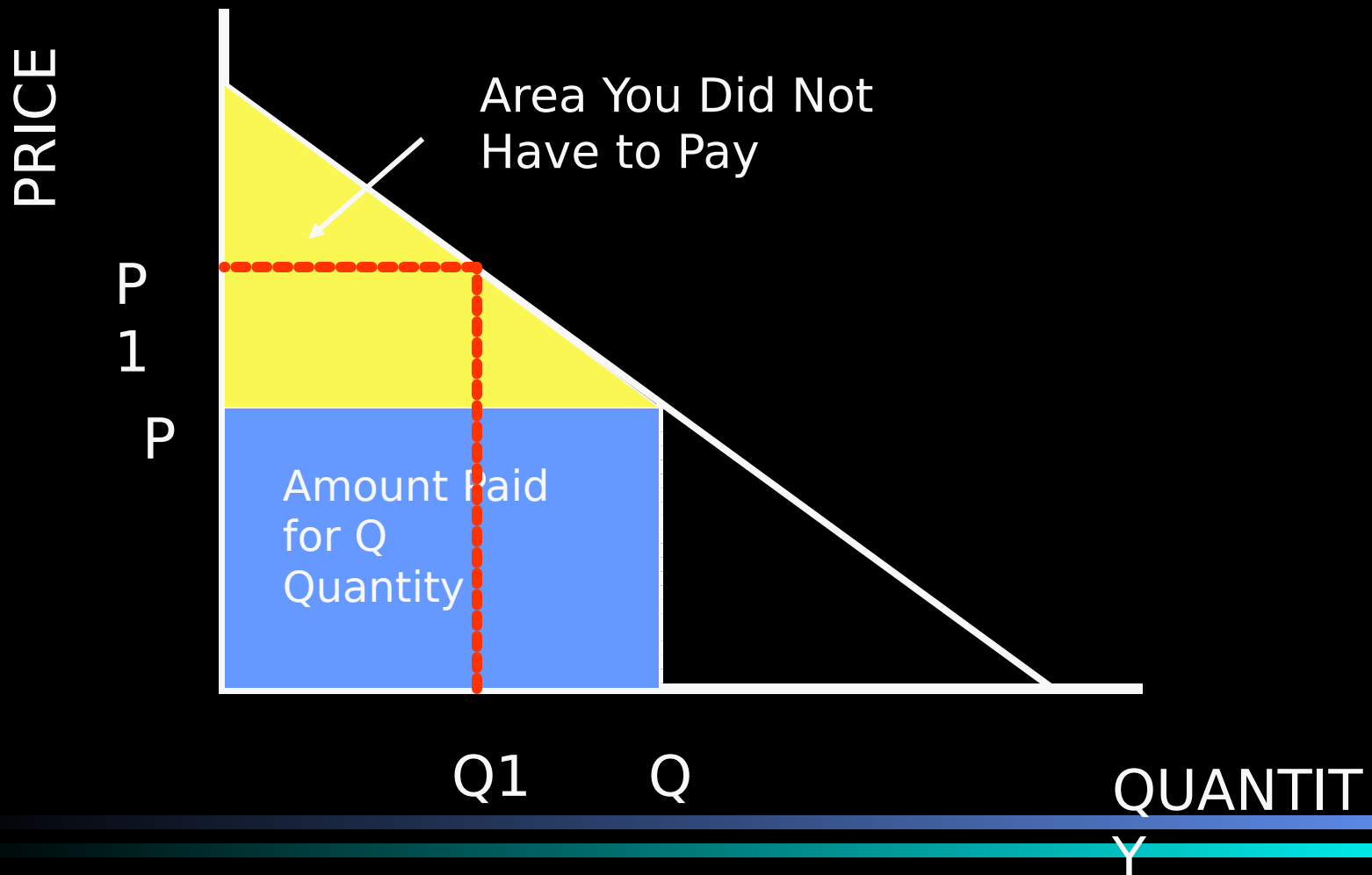
Area Under Demand Curve



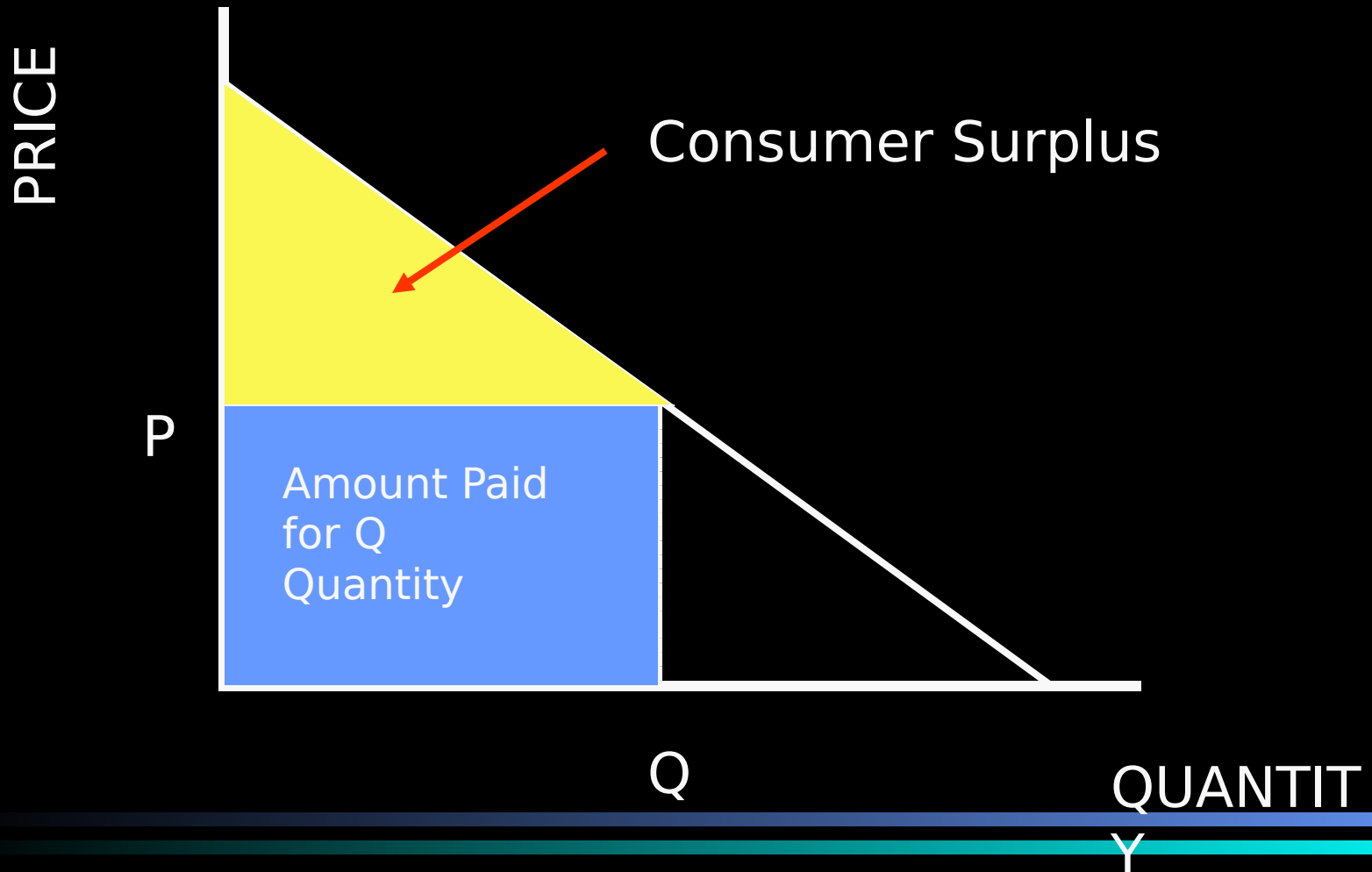
Area Under Demand Curve



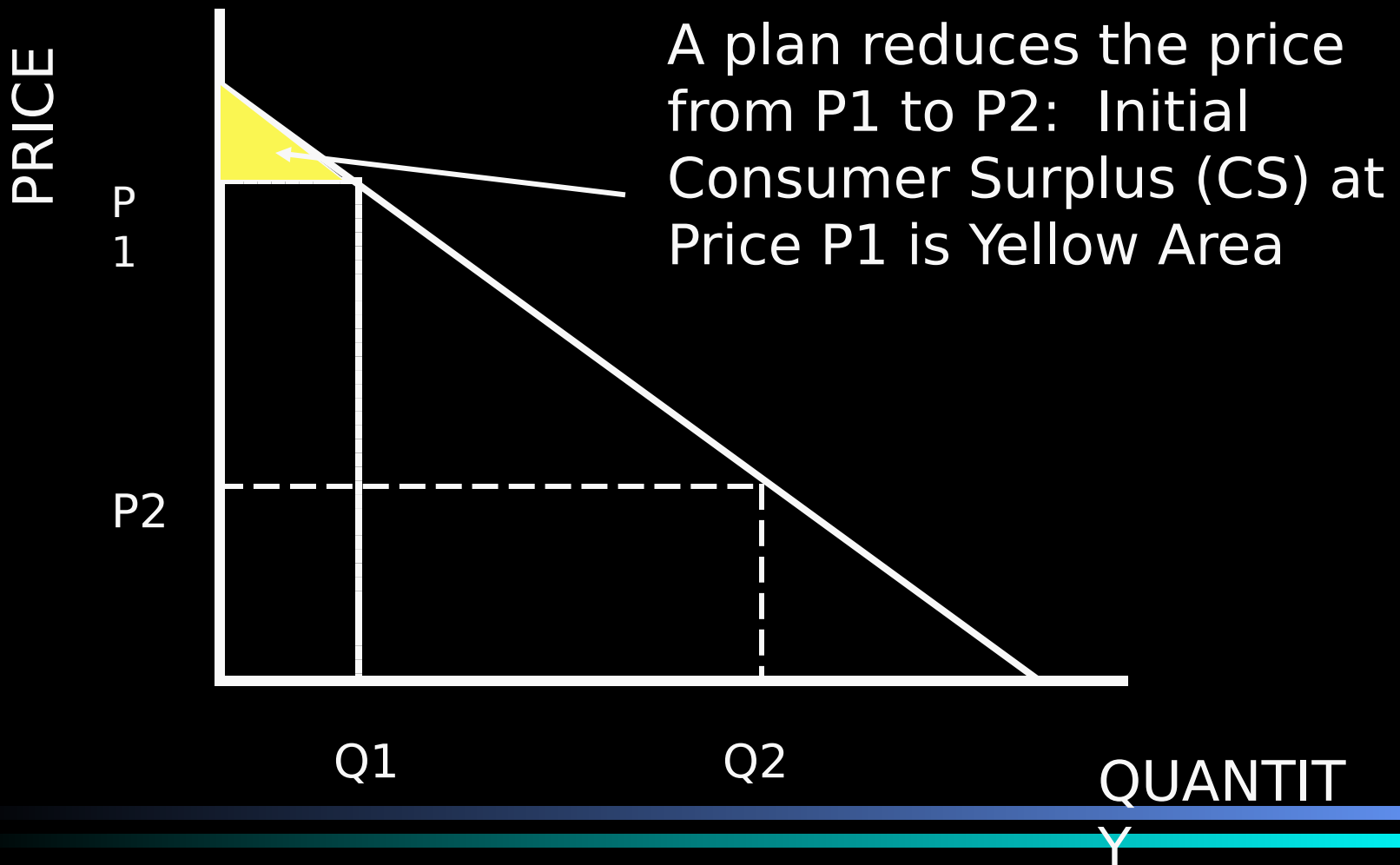
Area Under Demand Curve



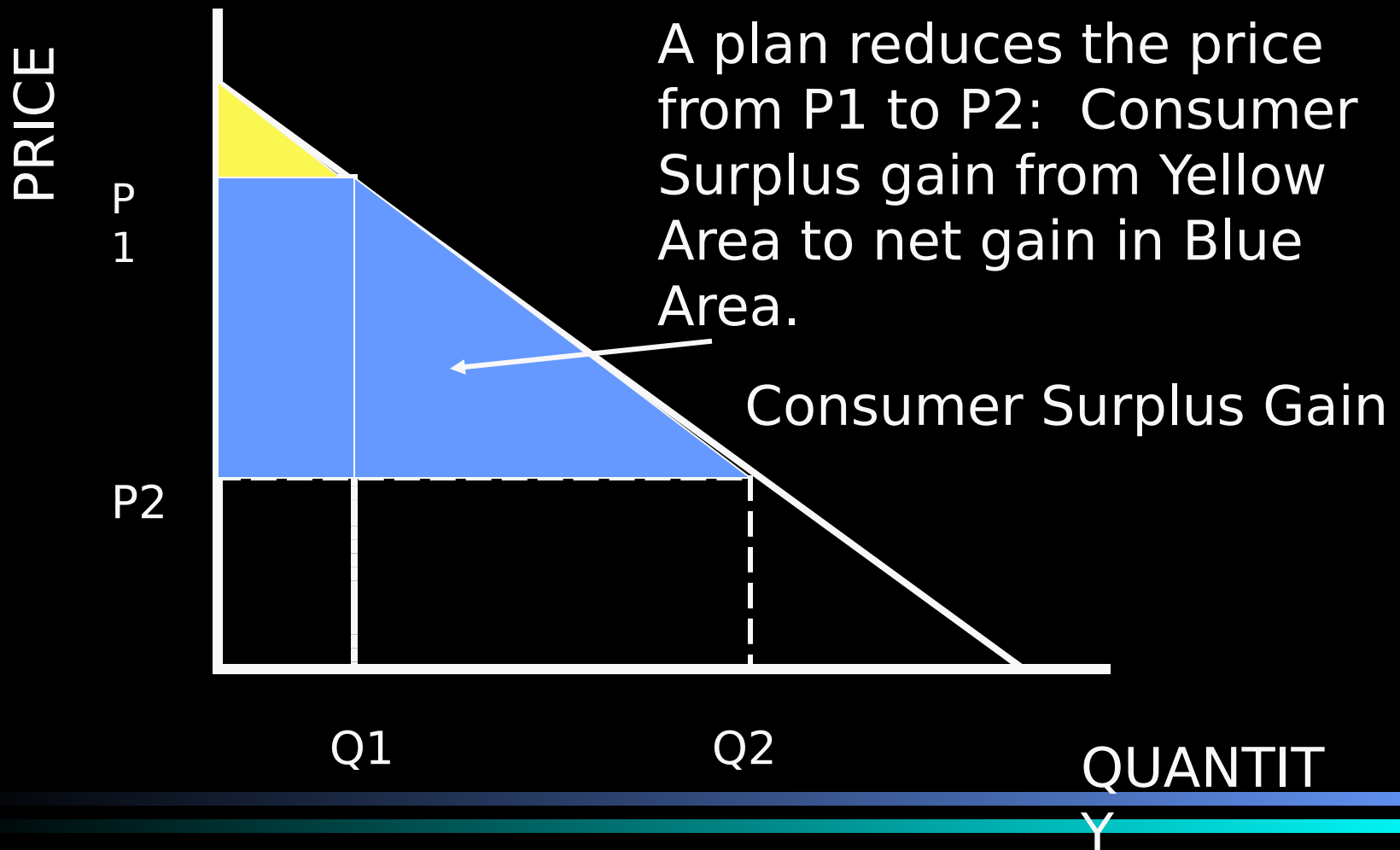
Consumer Surplus



Example of Consumer Surplus Benefits:



Example of Consumer Surplus:



Summary: Estimating Benefits

- These concepts guide our thinking.
- We rarely have demand or supply curves.
- Use your basic economic models to think about situations.
- We devise clever ways to approximate these areas.

Willingness To Pay Benefit Estimation - Approaches

- Actual or simulated market price
- Change in net income
- Cost of the most likely alternative
- Administratively established values

Costs:

Opportunity Cost:

- The cost of forgoing certain opportunities or alternatives in favor of pursuing others.

Opportunity Cost:

Job Search

- You currently earn \$50,000
- You start a business and earn \$40,000 profit
- How are costs defined?

Opportunity Cost:

- \$40,000 accounting profit
- \$10,000 economic loss
- The cost of opening the business is the forgone opportunity to make \$50,000

Opportunity Cost:

- Explicit Cost
 - Out-of-pocket cost
- Implicit Costs
 - Non-cash costs
- Opportunity Costs = Explicit + Implicit

Other Costs:

- **Incremental Costs**
 - Costs that change due to a decision
 - Only relevant costs of the decision
- **Sunk Costs**
 - Do not vary across alternatives (including without project)
 - Do not influence optimal choice

Associated Costs:

- The costs of measures needed over and above project measures to achieve the benefits claimed during the period of analysis.
- For example: irrigation water supply laterals, electric transmission lines
- Should be included in the net benefits and benefit to cost ratio

Economic vs. Financial Costs

- **Economic** = Opportunity Costs
 - Explicit and Implicit Costs
- **Financial** or Accounting Costs
 - Explicit or Actual Cost

IDC:

Interest During Construction

- Conceptually, is compounding pre-base year costs forward to account for time value of money
- Only an economic cost
- Sample calculations in your notebook

Equivalence of Money:

Equivalence of Money:

Sums of money that occur at different points in time cannot be directly compared to one another.

Equivalence of Money:

Price Level

Time Value

Price Level:

- The same price levels should be used at each point in time
- Select a common point in time as reference (base year)
- Resulting in:
 - Constant relative prices
 - Real prices

Price Level:

One ton of Reinforcing Steel

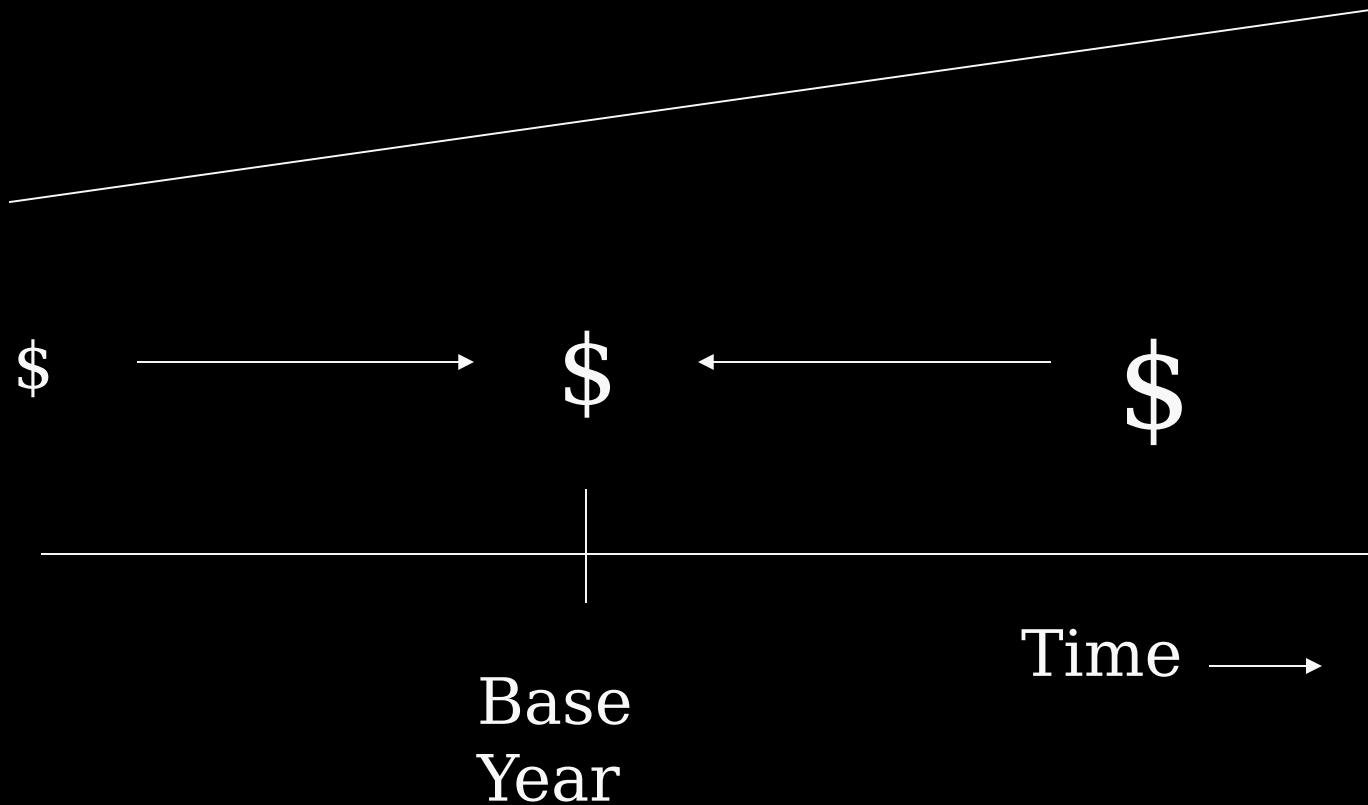
Year	Price
1951	\$ 19.0
1961	\$ 22.0
1971	\$ 30.0
1981	\$ 67.0
1991	\$ 101.0
2001	\$ 138.0

- Selected price level does not matter
- Consistency matters
- Such values can be found industry sources (ENR, Dodge, USACE CCWCI)

Price Level:

- Costs occur at different times
 - Construction costs are pre-base year and base year
 - O&M costs are post-base year
- Benefits can occur throughout the analysis

Time Equivalence:



Time Equivalence:

- Pre-base year values are brought forward in time by compounding.
- Post-base year values are brought back in time by discounting.

Time Equivalence: Example

Cost Schedule

1997	\$100	Compound
2002	\$100	Constant
2007	\$100	Discount

2002 Price Levels

Time Equivalence:

1997 Compounding

$$\$100 \times (1.1)^5 = \$100 \times 1.61 = \$161$$

\$100 spent in 1997 grows to \$161
by 2002

Calculations with 10% interest rate

Time Equivalence:

2007 Discounting

$$\$100 \times (1.1)^{-5} = \$100 \times 0.62 = \$62$$

\$100 expected expenditures in 2007
shrinks to \$62 by 2002

Calculations with 10% interest rate

Time Equivalence:

Project Costs 2002 Prices

1997 + 2002 + 2007 = Total Costs

161 + 100 + 62 = \$ 323

Time Equivalence:

- Changes in purchasing power are irrelevant to Corps planning.
- Discounting done to account for time value, not for inflation.

Average Annual Costs (AAC)

- All costs (and benefits) over time are put in same price level and time and summed (total present worth)
- Corps of Engineers evaluate on an average annual basis (AAC)
- Done by applying factor based on appropriate Federal interest rate

Decision Criteria

Benefit to Cost Ratio (BCR)

- Computed by dividing the Average Annual Benefits by Average Annual Costs
- Reflects the efficiency of a project
- Not the Federal selection criteria

Net National Economic Development (NED) Benefits

- The total NED average annual benefits minus the NED average annual costs

$$\text{Net NED Benefits} = \text{AAB} - \text{AAC}$$

- Used as the selection criteria, the project with highest net NED benefits

Review:

Review:

Basics of Economics

- Fundamental economic problem?

Scarcity

- Basis of economic benefits?

Consumer Surplus

Review:

- **Costs**

- Costs are important
- Different types of costs are used at different points in the process
- Economists care about opportunity and incremental costs

Review:

- **Time Equivalence of Money**
 - Price Levels
 - Values expressed in any common point in time
 - Time Value
 - Discount and escalate values to bring to the base year

Review:

- **Benefit to Cost Ratio** (BCR) = ratio of AAB/AAC
- **Net NED Benefits** = $AAB - AAC$

Discussion